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RISK ASSESSMENT OF LANDFILLS IN RELATION TO SURFACE WATER

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Background

Leachate from contaminated sites and landfills may pose a threat towards surface waters which has to be considered within the European Water Framework Directive. Out of 3300 old landfills in Denmark, an initial GIS-based screening suggested that 1100 landfills may have an impact on surface water bodies and we hypothesized that landfills are more common to have a potential impact on a surface water body than other types of contaminated sites. This calls for methods to perform risk assessment and subsequent investigations in relation to surface water, a task which may be come complicated due to difficult matrices and settings.

Aim

The regions of Central and Southern Denmark selected 64 landfills for review to develop a typology and risk assessment method for landfills towards surface water bodies, primarily streams. 6 different types of landfills were identified, each with distinct contamination pathways due to hydraulic and geological setting. Out of the selected 64 landfills, two landfills, Mågevej in Holstebro, DK, and Lilleskovvej in Tommerup, DK, were chosen for further investigations to validate the risk assessment procedure. Leaching zones in the stream bottom was attempted to be identified by temperature measurements in the stream bottom, electric conductivity measurements and chemical analysis. For both landfills an impact from leachate was measured in the surface water, but the impact was only significant for the Lilleskovvej landfill, partly due to the lesser discharge in the stream and partly because contaminants exceeding guideline values included Cd, As, Ba as well as xenobiotic organic compounds of which the landfill was expected to be the sole contributor. At the Mågevej landfill only classic landfill leachate parameters were identified in stream water such as Fe, ammonium and organic carbon of which there are probably other contributors, as the high background levels suggest.

Conclusion

Landfills can significantly impact surface waters, but our newly developed typology and tiered risk assessment approach can facilitate risk assessment and investigations in a difficult geological and hydraulic setting.